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CLOTHES DRYER
[Irui kansok]

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Claims

1. A clothes dryer, characterized by the fact that it is equipped with a rotary drum for drying clothes, a motor for driving the rotary drum, a heater for heating air blown into the above-mentioned rotary drum, and air fan; and the rotary drum is rotated and driven intermittently, with a long stop time and a short drive time.

2. The clothes dryer of Claim 1, characterized by the fact that a one-way clutch is installed at a rotary drum driving shaft of the motor for driving the rotary drum.

3. The clothes dryer of Claim 1, characterized by the fact that an electromagnetic clutch is installed at a rotary drum driving shaft of the motor for driving the rotary drum.

4. The clothes dryer of Claim 1, characterized by the fact that the motor for driving the rotary drum and a motor for driving the air fan are separately installed.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a home-use rotary drum dryer for delicate clothes such as wools and knitwear.

Prior art

Since delicate clothes such as wools and knitwear were damaged or shrunk in rotary drum clothes dryers, they could not be dried. For this reason, clothes have been dried in homes using a natural drying method that dries the clothes flat on a shelf is adopted.

Problems to be solved by the invention

The present invention solves these conventional problems, and its objective is to provide an apparatus that can dry delicate clothes such as wools and knitwear using a rotary drum clothes dryer.

Means to solve the problems

The present invention is a clothes dryer characterized by the fact that it is equipped with a rotary drum for drying clothes, a motor for driving the rotary drum, a heater for heating air blown into the rotary drum, and air fan; and the rotary drum of the clothes dryer is rotated and driven intermittently, with a long stop time and a short drive time. In the intermittent driving of the rotary drum, a one-way clutch is installed at a rotary drum driving shaft of the motor, and the intermittent action of "stopping" and "driving" is carried out by changing the rotating direction. In addition, as a second means for intermittent driving, an electromagnetic clutch may also be installed at the rotary drum driving shaft of the motor. Moreover, as a third means, the motor for driving the rotary drum and a motor for driving the air fan may also be separately installed.

Operation

According to the present invention with the above-mentioned constitution, when the rotating and driving of the rotary drum of the clothes dryer are stopped for a long time, for example, 10 min, air heated by the heater is blown into the rotary drum to operate the clothes dryer. The drum is rotated and driven for a short time, for example, 1 sec, to turn over the clothes. Delicate clothes are dried by repeating this process. In other words, since the tumbling (turnover) cycle of clothes in the rotary drum is reduced as much as possible and the clothes are dried mainly by blowing the heated air, the clothes can be dried without damage and shrinkage, though the drying time is slightly lengthened.

Needless to say, if the intermittent cycle operation of "long stop time" and "short drive time" of the rotary drum is stopped and the rotation is continued by a control switch, clothes such as cottons can also be dried in the conventional manner.

In addition, as the intermittent driving means of the rotary drum, Application Examples 1-3 (means) will be shown.

Application examples

Figure 1 is a cross section showing the clothes dryer of an application example in the present invention, Figure 2 is its electric circuit diagram, and Figure 3 shows the drying and shrinking characteristic diagram of a wool sweater. Figure 4(a) shows a second application example of the intermittent driving mechanism of a rotary drum, and Figure 4(b) is its electric circuit. Figure 5(a) shows a third application example of the intermittent driving mechanism, and Figure 5(b) is its electric circuit diagram.

In Figures 1-5(b), (1) is a rotary drum for drying clothes and is rotated and driven via motor (2), motor pulley (3), and belt (4). A filter (5) is mounted on the back face of the rotary drum (hereinafter, called the drum) (1). (6) is an air fan driven by fan pulleys (7) and (8) of the motor (2) and a belt (9). (10) in Figure 1 is a one-way clutch, and "stopping" and "driving" of the rotation of the drum (1) can be switched by changing the rotating direction of the motor (2). (11) in Figures 4a and 4b is an electromagnetic clutch and shows a second application example (means) that can switch "stopping" and "driving" of the rotation of the drum (1) by alternately turning on and off an electric current to the electromagnetic clutch (11). Figures 5a and 5b show a third application example (means), in which the motor (2) for driving the drum (1) and a fan motor (12) for driving the blowing fan (6) are separately

installed, and "stopping" and "driving" are switched by alternately turning on and off an electric current to the motor (2).

(13) is a heater that heats air (a) being blown into the drum (1) to dry clothes. Air (b) containing moisture after drying is discharged outside the dryer by air fan (6). (14) is a control switch that controls the rotation of the drum (1) and the supply of an electric current to the heater (13) by switching the supply of an electric current to the motor (2) and the electromagnetic clutch (11). (15) is a thermostat and that controls the temperature in the drum (1).

Next, the operation will be explained. When delicate clothes such as wools and knitwear are dried, while repeating the rotation, for example, intermittent driving of "driving for 1 sec" after "stopping for 10 min" of the drum (1) controlled by control switch (14), an electric current is supplied to the heater (13), and the air fan (6) continues to blow air by rotating. Therefore, since the clothes are tumbled at an interval of 1 sec per 10 min in the drum while being dried by blowing warm air, the damage or shrinkage of the clothes is extremely reduced.

Figure 3 shows the effects of the present invention, and is a shrinking characteristic diagram showing the shrinkage comparison of a sweater made of 100% wool. In Figure 3, the abscissa indicates the drying cycle after manually washing the 100% wool sweater with a detergent for wools. The ordinate indicates the reduction rate of the area of the wool sweater in %. In the figure, the curve shown by (A) shows a state in which the wool sweater is naturally dried on a shelf such as [illegible]. The area reduction rate is as small as about 3%, even after 10 cycles, but a drying time of one day or more is required. The curve shown by (B) shows the case of ordinary continuous tumble-drying with a clothes dryer. After 10 cycles, the area reduction rate reaches 20%, and drying is practically impossible. The curve shown by (C) is based on the drying method of the present invention. For example, if the rotation of the drum is set to a cycle of "1 sec per 10 min," since the area reduction rate after 10 cycles can be

reduced to within 5%, the wool sweater can be dried in this clothes dryer. In addition, the drying time can be much shorter than the natural drying time.

Effect of the invention

As mentioned above, according to the present invention, delicate clothes such as wools and knitwear can be dried at home in a rotary drum clothes dryer.

Brief description of the figures

Figure 1 is a cross section showing the clothes dryer of an application example in the present invention, and Figure 2 is its electric circuit diagram. Figure 3 is a drying and shrinking characteristic diagram of a wool sweater. Figure 4(a) is a cross section showing the main parts of a second application example of the intermittent driving mechanism of a rotary drum, and Figure 4(b) is its electric circuit diagram. Figure 5(a) is a cross section showing the main parts of a third application example of the intermittent driving mechanism, and Figure 5(b) is its electric circuit diagram.

Explanation of symbols

- | | |
|----|------------------------|
| 1 | Rotary drum |
| 2 | Motor |
| 6 | Air fan |
| 10 | One-way clutch |
| 11 | Electromagnetic clutch |
| 12 | Fan motor |
| 13 | Heater |

14 Control switch

15 Thermostat

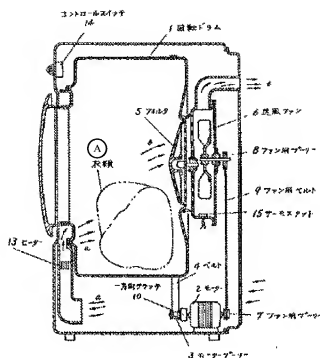


Figure 1

Key: A Clothes

1 Rotary drum

2 Motor

3 Motor pulley

4 Belt

5 Filter

6 Air fan

7 Fan pulley

8 Fan pulley

- 9 Fan belt
- 10 One-way clutch
- 13 Heater
- 14 Control switch
- 15 Thermostat

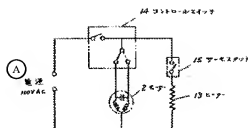


Figure 2

- Key: A Power source
- 2 Motor
 - 13 Heater
 - 14 Control switch
 - 15 Thermostat

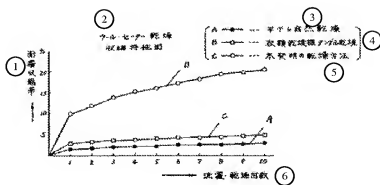


Figure 3

- Key: 1 Area reduction rate
- 2 Wool sweater drying shrinking characteristic diagram
- 3 Flat natural drying
- 4 Tumble-drying in a clothes dryer
- 5 Drying method of the present invention
- 6 Washing and drying cycle

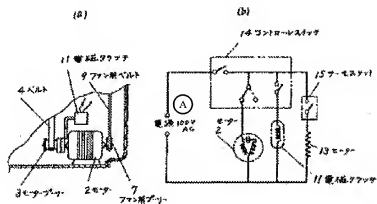


Figure 4

- Key: A Power source
- 2 Motor
- 3 Motor pulley
- 4 Belt
- 7 Fan pulley
- 9 Fan belt
- 11 Electromagnetic clutch
- 13 Heater

14 Control switch

15 Thermostat

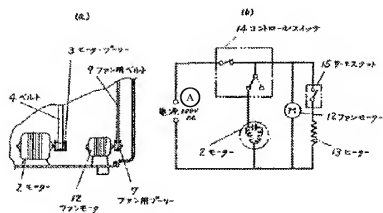


Figure 5

Key: A Power source

2 Motor

3 Motor pulley

4 Belt

7 Fan pulley

9 Fan belt

12 Fan motor

13 Heater

14 Control switch

15 Thermostat